

Tush iaku (WO2-076101)

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the maintenance plate holding a body, and the operation of this maintenance plate.

[0002]

[Description of the Prior Art] Lightweight-izing, a miniaturization, and thin shape-ization are demanded of devices, such as a cellular phone and a personal computer (personal computer), and also forming more thinly the thickness of the semiconductor chip used for these corresponding to this with 200 micrometers or less and 100 more micrometers or less is called for.

[0003] In order to meet such a demand, before carrying out grinding of the rear face of (1) semiconductor wafer, the dicing slot which is not penetrated to a rear face is formed in the front face comparatively shallowly. The technique divided into each semiconductor chip by carrying out grinding of the rear face of the semiconductor wafer after that, and making a dicing slot express from a rear-face side, (2) After dividing a semiconductor wafer into a semiconductor chip, the technique which carries out grinding of the rear face of each semiconductor chip, and forms it thinly is developed and put in practical use.

[0004] And since it is necessary to prevent that hold a thin semiconductor wafer or a thin semiconductor chip, and a crack arises with a rigid high maintenance plate comparatively in the case of processing in order to form a thin semiconductor chip by the above technique, an adhesive layer is formed in the front face of plates, such as a glass plate and a plastic sheet, a maintenance plate is constituted, and technique, such as carrying out grinding of a semiconductor wafer or the semiconductor chip to this, where attachment immobilization is carried out, is taken.

[0005]

[Problem(s) to be Solved by the Invention] However, there is a problem that a semiconductor chip will damage the semiconductor chip thinly formed of grinding if it is going to exfoliate that it is difficult to exfoliate from a maintenance plate and by force. Such a problem is generated in common with the case where a semiconductor wafer or not only a semiconductor chip but the body which is easy to damage is held with the maintenance plate.

[0006] Therefore, in case a body is exfoliated from a maintenance plate, it has the technical problem to enable it to exfoliate, without damaging a body.

[0007]

[Means for Solving the Problem] It is the maintenance plate with which this invention holds a body as a concrete means for solving the above-mentioned technical problem, and the maintenance plate which consists of the first plate which has the rigidity of extent which can support a body stably, the second plate which it is fixed to the rear face of the first plate, and is contracted with the heat of predetermined temperature, and an adhesive layer formed in the front face of the first plate at least is offered.

[0008] And the first plate's having consisted of plastics raw materials for this maintenance plate, the second plate's having consisted of heat shrink nature tapes, and the first plate's and second plate's having

fixed by the bond agent and an adhesive layer make it additional requirements to consist of UV hardenability binders with which it hardens by ultraviolet rays and adhesion declines.

[0009] Thus, since the maintenance plate constituted can be incurvated only by applying heat, it can reduce the adhesion of a maintenance plate and the body held very easily, and can exfoliate a body.

[0010] Moreover, when UV hardening mold binder which is a binder of the type with which it hardens by ultraviolet rays and adhesion declines as a binder used for an adhesive layer is used, before exfoliating a body from a maintenance plate, adhesion can be reduced by irradiating ultraviolet rays.

[0011] Moreover, the process which this invention is the operation of the above-mentioned maintenance plate, and sticks a body on the adhesive layer of a maintenance plate, The process which lays the maintenance plate holding a body in the chuck table of processing equipment, The process which performs predetermined processing to a body, and the process which removes a maintenance plate from a chuck table after predetermined processing is completed, The operation of the maintenance plate which consists of a process which the heat of predetermined temperature is applied [ process ] to a maintenance plate, and incurvates a maintenance plate to a rear-face side, and a process which exfoliates the body stuck on the maintenance plate from an adhesive layer is offered.

[0012] The operation of this maintenance plate and between the processes which the heat of predetermined temperature is applied [ processes ] to the rear face of the process and maintenance plate which remove a maintenance plate from a chuck table after predetermined processing is completed, and incurvate a maintenance plate to a rear-face side The heat of carrying out the process which ultraviolet rays are irradiated [ process ] and reduces adhesion to the adhesive layer of a maintenance plate, and predetermined temperature Being supplied with the warm water of predetermined temperature and a body are semiconductor chips. Processing equipment It is the grinding attachment equipped with the spindle unit which supports the grinding wheel arranged by standing face to face against the chuck table and chuck table which carry out attraction immobilization of the maintenance plate, and a grinding wheel pivotable at least. Predetermined processing makes it additional requirements to be processing which sticks the front face of a semiconductor chip on a maintenance plate, carries out grinding of the rear face of a semiconductor chip by the grinding wheel, and forms a semiconductor chip in predetermined thickness.

[0013] Thus, according to the operation of the maintenance plate constituted, after predetermined processing is completed, a body can be exfoliated only by applying heat to a maintenance plate.

[0014]

[Embodiment of the Invention] The case where grinding of a semiconductor wafer is performed as a gestalt of operation of this invention using the maintenance plate 10 and this which show drawing 1 R>1 and drawing 2 is mentioned as an example, and is explained.

[0015] As shown in drawing 1 , the maintenance plate 10 consists of the first plate 11 and second plate 12. The first plate 11 is the rigid high plate-like part material which can also support stably the thin body which consists of aluminum, plastics, etc. and is easy to damage comparatively. On the other hand, the second plate 12 is a heat shrink nature tape which has the property contracted by applying predetermined heat.

[0016] When rear-face 11b of the first plate 11 and surface 12a of the second plate 12 are fixed using a bond agent, both are united like drawing 2 . And a binder is applied to surface 11a of the first plate 11, and an adhesive layer is formed.

[0017] In the adhesive layer formed in surface 11a, as shown in drawing 3 , it fixes by turning a rear face for semiconductor wafer W which is going to carry out grinding up, namely, sticking a front face and an adhesive layer. And since rigidity is comparatively high, semiconductor wafer W is stably supported for the first plate 11.

[0018] As shown in this semiconductor wafer W at drawing 4 , the dicing slot 13 is beforehand formed in the surface street, and by carrying out grinding from the rear-face side, the dicing slot 13 can express to a rear-face side, and can divide into each semiconductor chip. Thus, the grinding attachment 20 shown in drawing 5 which is a kind of processing equipment is used for the grinding of the rear face of semiconductor wafer W supported by the maintenance plate 10.

[0019] From the edge of a pedestal 21, a wall 22 stands up, and is prepared, the rail 23 of a couple is perpendicularly arranged in the field inside this wall 22, and this grinding attachment 20 is constituted so that the grinding means 25 attached in the support plate 24 in connection with a support plate 24 moving up and down along with a rail 23 may move up and down. Moreover, on the pedestal 21, a turntable 26 is arranged pivotable, on a turntable 26, a semiconductor wafer is held further, and the pivotable chuck table 27 is arranged.

[0020] In the grinding means 25, the lower part of the mounter 29 at the head of spindle 28b supported pivotable by spindle housing 28a which constitutes the spindle unit 28 is equipped with the grinding wheel 30. The grinding stone 31 has fixed in the lower part of the grinding wheel 30, and the grinding wheel 30 has composition rotated with the revolution of spindle 28b.

[0021] The nut with which the supporter 34 which the ball screw 32 is perpendicularly arranged in the background of a wall 22, and the pulse motor 33 was connected with this ball screw 32, and penetrated the wall 32 and was connected with the grinding means 25 as shown in drawing 6 was equipped is screwing, and it has the composition that the grinding means 25 connected with a supporter 34 and this in connection with a ball screw 32 rotating by actuation of a pulse motor 33 moves up and down.

[0022] It connects with the control section 36 through the pulse motor driver 35, and a pulse motor 33 moves the grinding means 25 up and down by driving a pulse motor 33 under control by the control section 36, and rotating a ball screw 32. Moreover, the location of the perpendicular direction of a supporter 34 is measured by the linear scale 37, and vertical movement of the grinding means 25 is controlled by the precision by transmitting the information to a control section 36.

[0023] It connects with the servo driver 38, and the servo driver 38 is connected to the encoder 39 and servo motor 40 with which the lower part of the chuck table 27 was equipped, and a control section 36 can rotate the chuck table 27 under control by the control section 36.

[0024] Thus, in case grinding of the rear face of the semiconductor chip 12 shown in drawing 3 and drawing 4 using the grinding attachment 20 constituted is carried out, the maintenance plate 10 is laid in the chuck table 27 of grinding attachment 20. At this time, attraction immobilization of the maintenance plate 10 is carried out in adsorption side 27a of the chuck table 27.

[0025] And while rotating positioning and a spindle 28 for semiconductor wafer W which fixed on the maintenance plate 10 directly under the grinding wheel 30, the grinding means 25 is dropped. And while the grinding wheel 30 rotates with the high-speed revolution of a spindle 28, grinding of the rear face is carried out by the grinding stone 31 by the rotating grinding stone 31 contacting two or more semiconductor chips, and applying thrust.

[0026] Thus, if grinding is performed, the dicing slot 13 will express from the rear face of semiconductor wafer W soon, and it will be divided into each semiconductor chip C by the dicing slot 13 as shown in drawing 7  $R > 7$ . And predetermined thickness can be made to semiconductor chip C if grinding is performed further.

[0027] Semiconductor chip C is in a condition as it is, namely, is in the condition that each semiconductor chip C was stuck on the adhesive layer, and was supported by the maintenance plate 10, and is removed from the chuck table 27. And predetermined heat is applied to the second plate 12 which constitutes the maintenance plate 10. For example, the warm water of predetermined temperature is poured.

[0028] Since it is a heat shrink nature tape, the second plate 12 will be contracted if predetermined heat is applied with warm water. And since the first plate 11 and second plate 12 are united, as shown in drawing 8, the maintenance plate 10 curves as a whole. Then, since adhesion falls while being in the condition of having lost touch with an adhesive layer slightly, the edge of each semiconductor chip C can exfoliate from an adhesive layer easily. Therefore, in order not to add the force strong in the case of exfoliation, semiconductor chip C is not damaged. Thus, by the very easy method of pouring warm water, the maintenance plate 10 can be incurvated easily and a semiconductor chip can be exfoliated certainly.

[0029] In addition, if ultraviolet rays are irradiated and adhesion is reduced to an adhesive layer before applying predetermined heat to the second plate 12 after removing the maintenance plate 10 when UV

hardening mold binder which is a binder of the type with which it hardens by ultraviolet rays and adhesion declines as a binder used for an adhesive layer is used, a semiconductor chip can be exfoliated more easily and the danger that a semiconductor chip will be damaged can be mitigated more. In this case, if a means to irradiate ultraviolet rays is arranged in grinding attachment 20, the activity to which the adhesion of an adhesive layer is reduced can be done efficiently.

[0030] Moreover, in the gestalt of this operation, although the case where a semiconductor wafer and a semiconductor chip were held with a maintenance plate was mentioned as the example and explained, the body held is not limited to a semiconductor wafer.

[0031]

[Effect of the Invention] Since the maintenance plate concerning this invention can be incurvated only by applying heat as explained above, the adhesion of a maintenance plate and the body held can be reduced by the very easy approach. Therefore, a body can be exfoliated easily [ it is reasonable and ] from a maintenance plate, and a body is not damaged.

[0032] Moreover, since adhesion can be reduced by irradiating ultraviolet rays before exfoliating a body from a maintenance plate when UV hardening mold binder which is a binder of the type with which it hardens by ultraviolet rays and adhesion declines as a binder used for an adhesive layer is used, a body can be made to exfoliate more safely and efficiently.

[0033] Furthermore, since according to the operation of the maintenance plate concerning this invention a body can be exfoliated only by applying heat to a maintenance plate after predetermined processing is completed, a body can be taken out simply and certainly.

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[Translation done.]

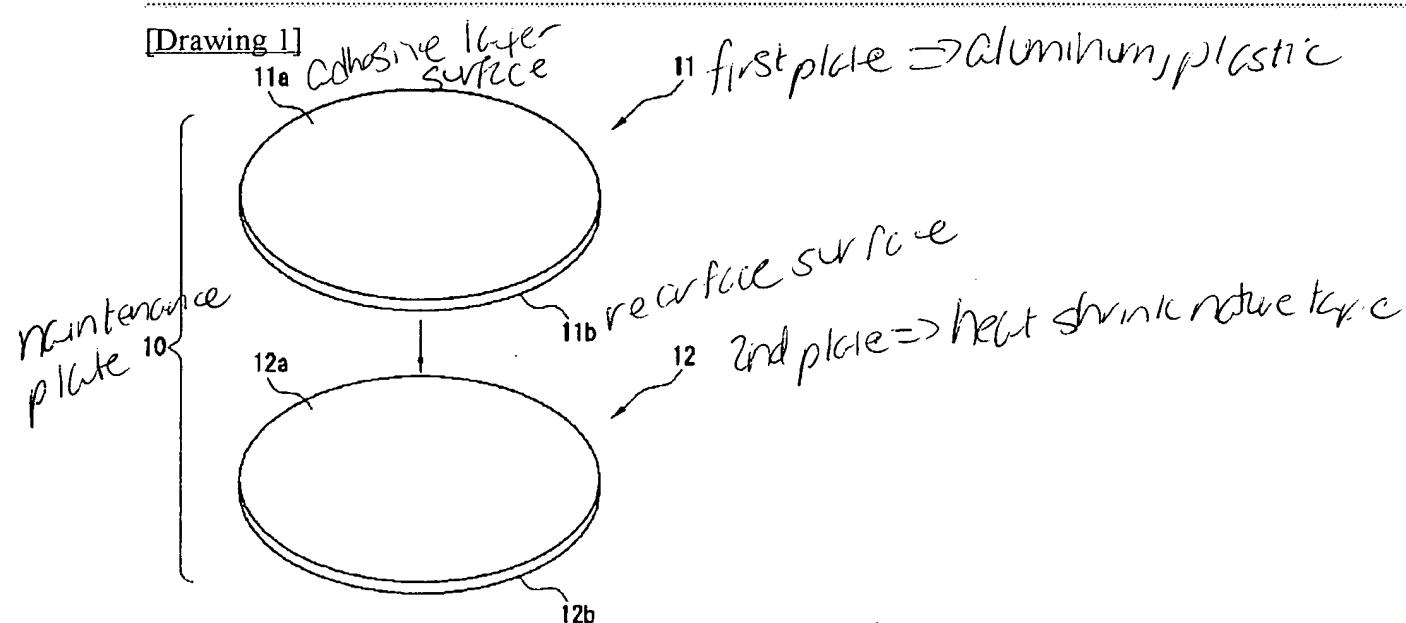
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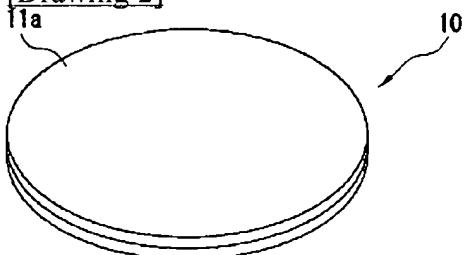
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## DRAWINGS

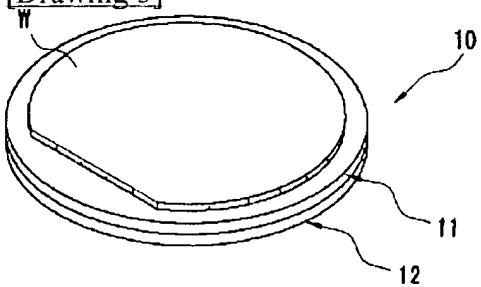
## [Drawing 1]



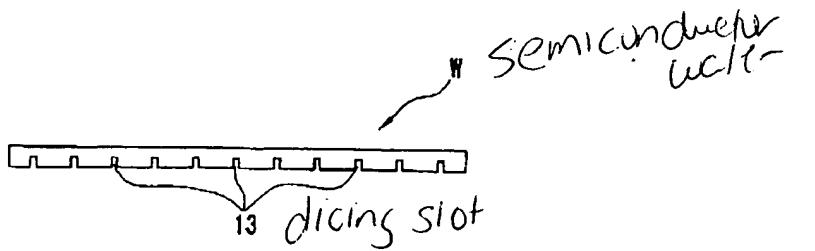
## [Drawing 2]



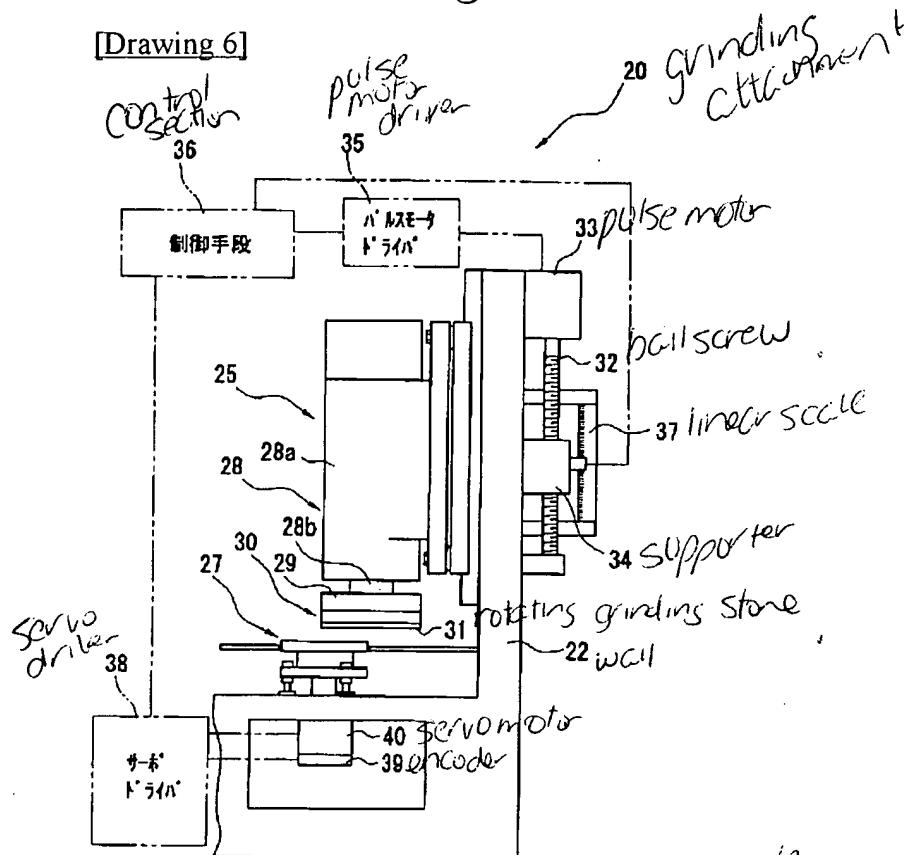
## [Drawing 3]



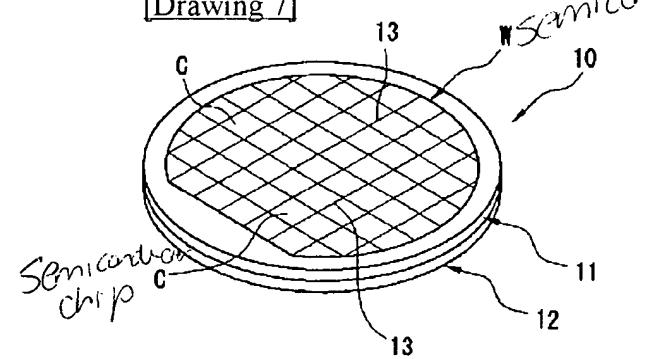
## [Drawing 4]



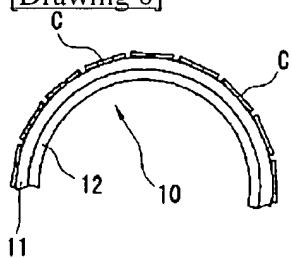
[Drawing 6]



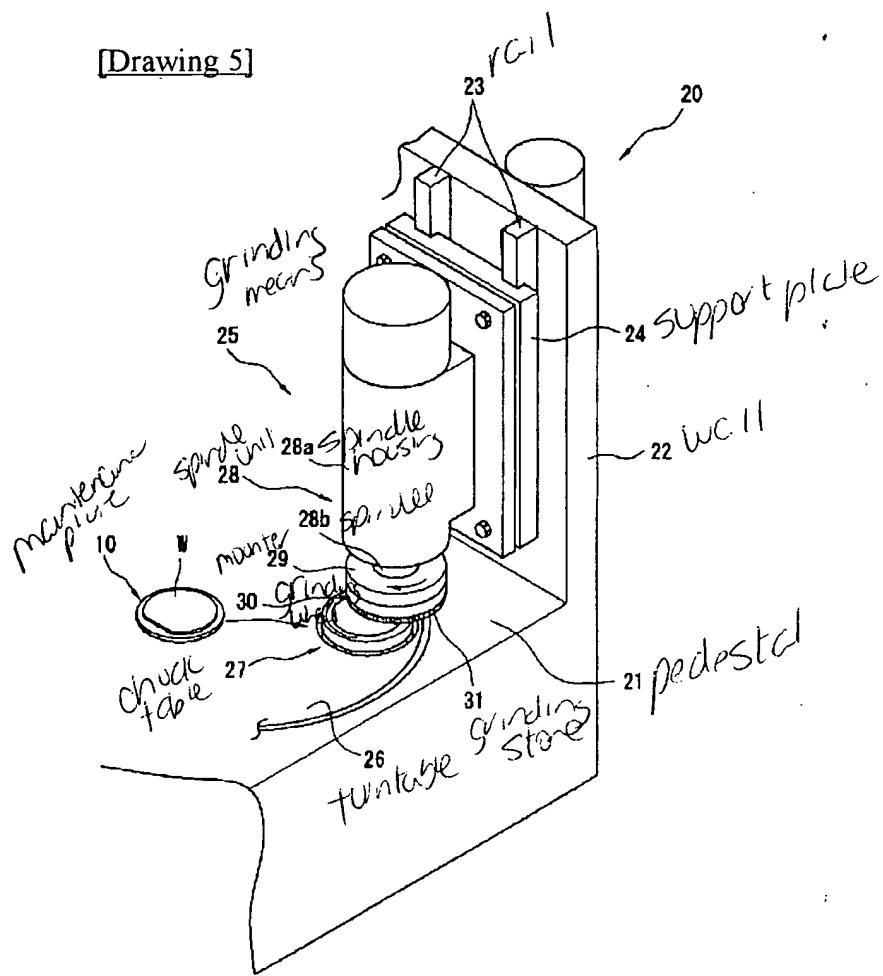
[Drawing 7]



[Drawing 8]



[Drawing 5]



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[Translation done.]